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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,943	04/19/2005	Hong-zhi Zhang	14982-62295	4512

24728 7590 05/28/2008

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EXAMINER	
YAM, STEPHEN K	
ART UNIT	PAPER NUMBER
2878	

MAIL DATE	DELIVERY MODE
05/28/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/531,943	ZHANG, HONG-ZHI	
	Examiner	Art Unit	
	STEPHEN YAM	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/13/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Piot et al. US 6,256,016.

Regarding Claim 1, Piot et al. teaches (see Fig. 1-3) a method for processing optical signals in a computer mouse (110), characterized in that, the relative displacement vector between the mouse device and the illuminated object surface (120) producing laser (see Col. 4, line 9) speckles is reflected by means of collecting movement information (to (320a), (320b)) of laser speckle signals (see Col. 4, lines 23-42).

Regarding Claim 2, Piot et al. teaches (see Fig. 1-3) a method for processing optical signals in a computer mouse (110), characterized in that, the relative displacement vector between the mouse device and the illuminated object surface (120) producing laser (see Col. 4, line 9) speckle interferences is reflected by means of collecting movement information (to (320a), (320b)) of laser speckle interference signals (since a speckle is constructed from an interference signal).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piot et al. in view of Jackson US 4,794,384.

Regarding Claim 3, Piot et al. teach the device in Claims 1 and 2, according to the appropriate paragraph above. Piot et al. also teach said laser speckle signals or laser speckle interference signals are received by a photo sensor ((320a), (320b)), and said laser speckle signals or laser speckle interference signals are processed (see Col. 4, lines 43-57), so as to calculate the quantity of laser speckle pulses or laser speckle interferences pulses received by the photo sensor, and to determine the relative displacement between the mouse device and the illuminated object surface producing laser speckles (see Col. 14, line 65 to Col. 15, line 18) on the basis of the average size of the laser speckles or the laser speckle interferences (see Col. 18, lines 43-56). Piot et al. do not teach the processing, so as to calculate the quantity of laser speckle pulses or laser speckle interferences pulses received by the photo sensor. Jackson teaches (see Fig. 2) a similar device, with processing laser speckle and laser speckle interference signals (see Col. 4, lines 25-36) so as to calculate the quantity of laser speckle pulses or laser speckle interferences pulses received by the photo sensor (see Col. 6, lines 56-63 and Col. 7, lines 5-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the processing, so as to calculate the quantity of laser speckle

pulses or laser speckle interferences pulses received by the photo sensor, as taught by Jackson, in the method of Piot et al., to improve accuracy in the detection of displacement quantity.

Regarding Claim 4, Piot et al. teach said photo sensor has groups (rows and columns) of photoelectric sensing units (see Fig. 4B-4D and col. 9, lines 45-50), wherein each group consists of two or more photoelectric sensing units aligned in a line (row/column); after laser speckle signals or laser speckle interference signals from the object surface illuminated by laser beams are received, relevant photoelectric signals are shaped by the group of photoelectric sensing units (see Col. 14, lines 67-19) to calculate the size of the component of relative displacement vector between the photo sensor and the illuminated object surface lying in the direction of the alignment of photoelectric sensing units (see Col. 10, lines 53-56); in the meantime, the direction of said component of the relative displacement vector is determined by the skewing of the electric signals produced by these two or more photoelectric sensing units (see Col. 14, line 65 to Col. 15, line 18). Piot et al. do not teach the relevant photoelectric signals as amplified. Jackson teaches the signals as amplified (see Col. 7, line 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the signals as amplified, as taught by Jackson, in the method of Piot et al. in view of Jackson, to produce an improved photoelectric signal for greater contrast of speckle images and greater displacement detection sensitivity.

Regarding Claim 5, Piot et al. in view of Jackson teach said photo sensor has at least two groups (row and column) of photoelectric sensing units, wherein each group consists of two or more photoelectric sensing units aligned in a line (see Fig. 4B-4D), and at least one group has an aligning direction different from the others (row vs. column), two of the groups may intersect

with each other and use common units (row and column); after laser speckle signals or laser speckle interference signals from the object surface illuminated by laser beams are received, relevant photoelectric signals are amplified and shaped by these groups of photoelectric sensing units to calculate the size and direction of the component of relative displacement vector between the photo sensor and the illuminated object surface of the respective group (Δx, Δy) (see Col. 14, line 65 to Col. 15, line 18), and the relative displacement vector between the photo sensor and the illuminated object surface in the two-dimensional plane is calculated on the basis of the size and direction of the components of said relative displacement vector calculated by two or more groups in different directions (x, y) and the intersection angle (90 degrees) between the components in different directions.

Regarding Claim 6, Piot et al. in view of Jackson teach a device for processing optical signals in a computer mouse for carrying out the method for processing optical signals in a computer mouse as claimed in claim 1, consisting of a mouse body (210) (see Fig. 2A, 2B); inside the mouse body, an amplifying and shaping module, a direction identifying and counting module, and a computer interface circuit (attached to cable going to (130)) for processing photoelectric signals are disposed and connected in sequence, characterized in that, said device further includes at least one laser device (250) and a photo sensor (320a, 320b) for receiving laser speckle signals from the object surface illuminated by laser beams (see Fig. 3); said photo sensor transfers the received photoelectric signals to the amplifying and shaping module. Piot et al. in view of Jackson do not teach an amplifying and shaping module and a direction identifying and counting module connected in sequence. However, it is well known in the art to provide general modules for providing the claimed method functions in a device. It would have been

obvious to one of ordinary skill in the art at the time the invention was made to provide the amplifying and shaping module and a direction identifying and counting module connected in sequence, in the device of Piot et al. in view of Jackson, to enable and execute the amplifying, shaping, direction identifying, and counting functionality in the claimed parent method.

5. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Piot et al. in view of Jackson, further in view of Bidiville et al. US 5,703,356.

Regarding Claim 7, Piot et al. in view of Jackson teach a device for processing optical signals in a computer mouse as claimed in claim 6. Piot et al. further teaches said device further includes a laser device (250) and a photo sensor (320a, 320b) for receiving laser speckle interference signals from the object surface illuminated by laser beams; the laser beams emitted by said laser device illuminates on one or more areas of the surface producing laser speckle interferences (see Fig. 3). Piot et al. do not teach two or more laser devices, wherein each area is illuminated by at least two beams. Bidiville et al. teach (see Fig. 12A, 12B) a similar device with two light sources (200) and a photo sensor (1230) for detecting speckle interference images (see Col. 5, line 55) and calculating a displacement (see Col. 2, lines 60-62), wherein each area is illuminated by at least two beams (see Fig. 12A, 12B). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide at least two laser devices wherein each area is illuminated by at least two beams, as taught by Bidiville et al., in the decice of Piot et al. in view of Jackson, to improve the speckle effect and increase contrast for improved detection sensitivity.

Regarding Claim 8, Piot et al. in view of Jackson and Bidiville et al. teach the device in Claim 7, according to the appropriate paragraph above. Piot et al., Jackson, and Bidiville et al. do not teach using a single laser device and a beam splitter instead of two laser devices. It is well known in the art to use beam splitters, fiber optics, and other optical components to substitute plural light sources with a single light source, to save costs of expensive light sources. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a single laser device and a beam splitter instead of two laser devices, in the device of Piot et al. in view of Jackson and Bidiville et al., to reduce costs of the device for improved industrial applicability.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Knobel US 6,563,129, Nahum et al. US 6,642,506, and Knee et al. US 5,994,710 teach similar speckle measurement devices.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHEN YAM whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571)272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Stephen Yam/
Primary Examiner, Art Unit 2878